Nosocomial Bloodstream infection

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Nosocomial UTI

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WHY?

Catheter-associated Urinary Tract Infections

-most common site of nosocomial infection (>=40%)

--> 20% of patients catheterized and maintained on closed drainage may be expected to become infected .

-bacteremia occurs in < 1% of catheterized patients, but, if occurs, the case fatality rate =30% (*AJM 1976;851-350)*

Where?

Nosocomial Urinary Tract Infections - PSU

(Year = 1987)

Urology	= 15.5	/100 patients
Medicine	= 7.7	/100 patients
Neurosurgery	= 6.7	/100 patients
Orthopedics	= 5.1	/100 patients
Gynaecology	= 3.9	/100 patients
Gen. Surgery	= 2.2	/100 patients

What is the recent rate of UTI in PSU???

หอผู้ป่วย	UTI 2549	UTI 2550
ศัลยกรรมประสาท	21.3	17.14
ศัลยกรรมหญิง	10.7	15.50
ศัลยกรรมชาย 2	11.41	9.17
ศัลยกรรมชาย 1	4.35	8.08
อุบัติเหตุ	4.80	6.30
ICU1	5.93	6.26

US NNIS 50th percentile rate = 3.3 UTIs / 1000 cath.-day

Why so high rate of UTI ???

Risk of UTI after catheterization

Single in & out Cath:

Male	**= 2-3%**
Normal Female	**= 6%**
Post partum	**= 10%**
Elderly Female	**= 15%**
Complicated postpartum	**= 23%**

Ref.:Turck M; Medicine 1962; 88: 834

Inappropriate Use of the Indwelling Urinary Tract Catheter in Hospitalized Patients

Results

- During 24 days
- 132 patients
- 22 in Neurosurgery
- 17 Trauma
- 80 ICU
- 13 RCU
- 528 catheter-days
- 37 initial catheter insertions

Incidence of catheter-related UTI

Wards	n	Rate	95%C.I
• ICU	8	28	12 - 55
• Neurosurgery	2	35	4 - 127
• RCU	2	25	3 - 91
• Trauma	1	18	0 - 99
• TOTAL	13	27	14 - 46

n = Number of UTI
Rate = n/1000 catheter-days
US NNIS 50th percentile rate = 3.3 UTIs / 1000 cath day

Avoiding indwelling catheterization

- CDC guidelines
  - Insert only when necessary
- Arch Intern Med 1995;155:1425
  - 21% of indwelling urinary catheter were unjustified

Criteria for justified use

1. **Urine output monitoring**
   - **Accurate urine output monitoring**
   - **In incooperative patient**
2. **Urinary obstruction**
   - **Anatomical**
   - **Functional**
3. **Prevention of urinary obstruction**
   - **Blood clot in urinary bladder**

Criteria for justified use

4. Surgical operation
   - Genitourinary
   - Pelvic cavity
   - Prolong duration of operation
5. Urine incontinence with coexisting
   - Ulcer of perineum or sacrum
6. Terminally- ill patient

Unjustified initial insertion of urinary catheter

Wards	n	%	95%C.I
• Neurosurgery	10	-	
• Trauma	5	40	5 - 85
• ICU	16	19	4 - 46
• RCU	6	-	
• TOTAL	37	14	5 - 29

n = number of initial insertion of catheter
%= percentage of unjustified insertion

Unjustified continued use of indwelling urinary catheter

Wards	n	%	95%C.I
• Neurosurgery	57	26	16 - 40
• Trauma	56	25	14 - 38
• ICU	289	14	10 - 18
• RCU	79	11	5 - 20
• TOTAL	481	16	13 - 20

n = Catheter-day
%= percentage of unjustified day

Indication of initial use of urinary catheter

Indication	n	%	95%C.I
• Monitor	18	49	32 - 66
• Obstruction	8	22	10 - 38
• Surgery	3	8	2 - 21
• Others	-	-	
• Unclear	3	8	2 - 21
• Unjustified	5	14	5 - 29

Indication of continued use of indwelling urinary catheter

Indication	n	%	95%C.I
• Monitor	220	46	41 - 50
• Obstruction	53	11	8 - 14
• Surgery	60	13	10 - 16
• Others	60	13	10 - 16
• Unclear	11	2	11 - 41
• Unjustified	77	16	13 - 20

Daily reminders to physicians

Infect Control Hosp Epidemiol 2004;25:974

- ICU of a tertiary-care hospital, Taiwan
- Daily reminders to physicians
- From ICU nurse
- To remove unnecessary urinary catheter
- After 5 days of insertion
- Result in reduction of:-
- Average duration 7.0 $\rightarrow$ 4.6 days
- UTI 11.5 $\rightarrow$ 8.3 per 1000 catheter-days

RULE # 1

“catheterize only if necessary”

- enough trial for the patient ?
- adequate post-op. analgesia?
- bedside commode ?
- condom catheter ?

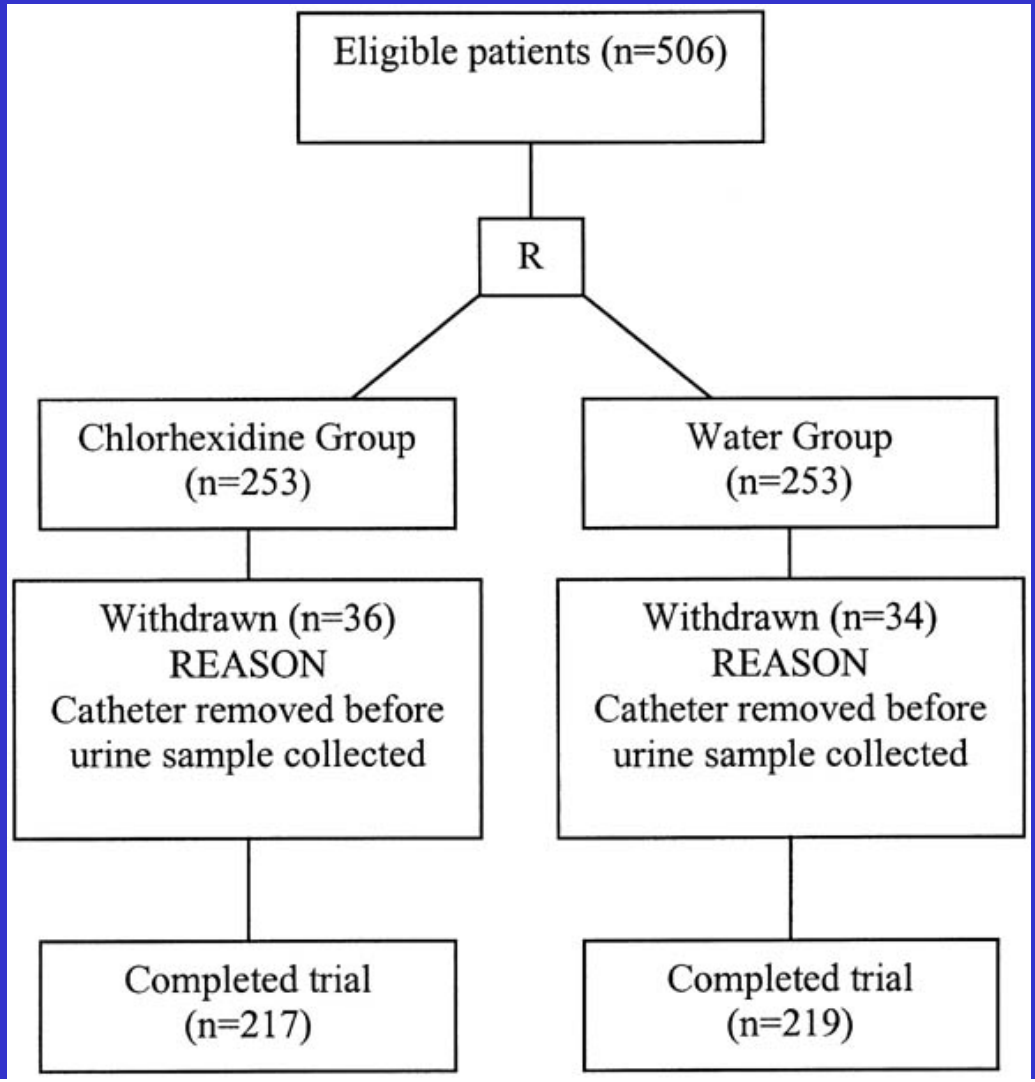
Pampers (Pads)?

Nordqvist and associates demonstrated that in elderly patients the introduction of a continence training program and the use of pads resulted in a reduction in the use of antibiotics and lower hospital cost.

Ref. : J Hosp Infect. 1984;5:298

Perineal Flush: ??Antiseptic??

Water or antiseptic for periurethral cleaning before urinary catheterization: A randomized controlled trial. *Webster J et al.AJIC 2001;29:389*



Characteristic	Water group (n = 219) No.	%	CHG group (n = 217) No.	%	Significance
<30 years	154	70.3	152	70.0	.517
Primipara	105	48.4	111	51.2	.316
2 Vaginal examinations	146	68.9	131	62.1	.086
Previous UTI	27	12.9	36	17.1	.137
Cesarean delivery	101	46.1	124	57.1	.014*
>20 hours of indwelling catheter	92	42.2	106	49.1	.090

Age

CHG, Chlorhexidine gluconate 0.1%;

Rates of bacteriuria were similar in each group (water group, 8.2%; antiseptic group, 9.2%; odds ratio, 1.13; 95% confidence interval, 0.58-2.21)

Silver-coated catheter?

Several randomized trials have yielded conflicting results.The largest studies did not show a lower incidence of bacteriuria.

Ref.: Dtickler DJ. Curr Opinion in Infect Disease

2000; 13:389

Catheter

“as small a catheter as possible, consistent with good drainage, should be used to minimize urethral trauma “

“a single-use packet of lubricant jelly should be used for insertion.”
CDC *category II recommendation.*

Soap vs. Alcohol ?

6 healthcare workers had 2 *15-second contacts* for each hand followed by either soap handwash or alcohol hand rinse. Between 4 to 5 minutes after contact, each hand manipulated a catheter; the catheter was then cultured

RESULTS: *Soap handwash failed to prevent gram-negative bacteria transfer to the catheter in 11 of 12 (92%) experiments; alcohol hand rinse in 2 of 12 (17%) (p less than .001).*

Ref.:Ehrenkranz NJ, Alfonso BC. Infect Control Hosp Epidemiol. 1991 Nov;12(11):654-62.

Retained Foley Catheter: Opened System

90 % bacteriuria within 2 days

98 % bacteriuria within 4 days

Ref.: Lewin j. Ann Int Med 1964; 69:56

RULE # 2

“The catheter and drainage tube should not be disconnected unless the catheter must be irrigated. Always collect the urine specimen through the sampling port.”

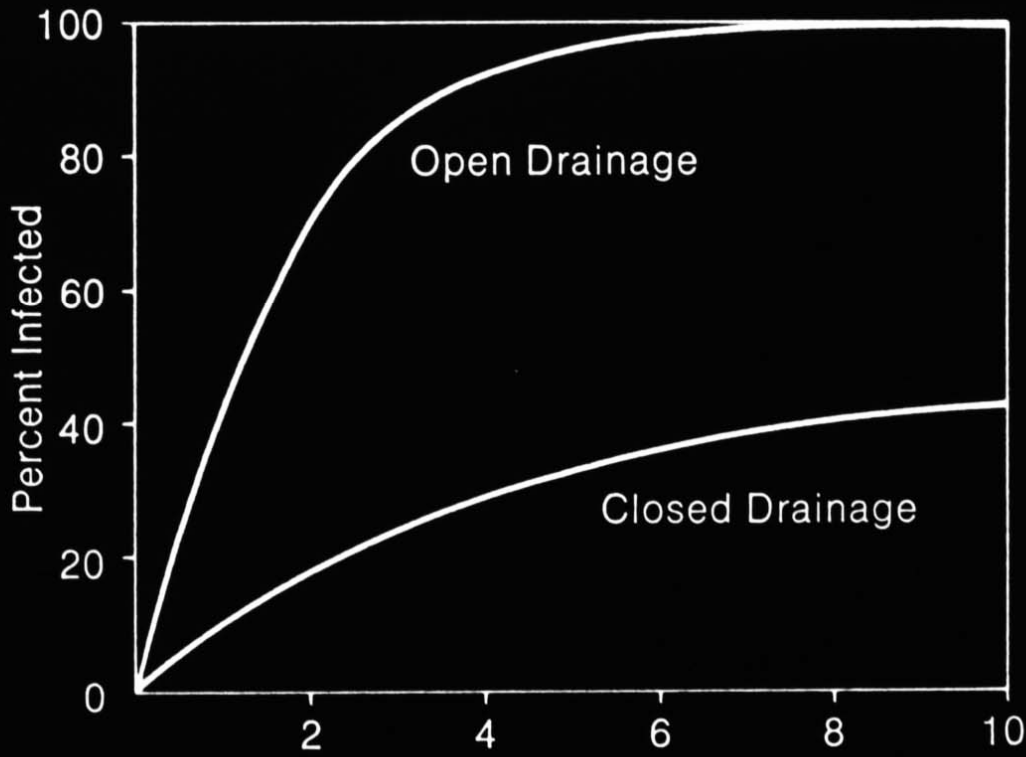
Retained Foley Catheter: Closed System

5-10% bacteriuria per day

50% bacteriuria on day 11-13

15-25 % bacteriuria with good catheter care

Prevalence of bacteriuria in catheterized patients according to duration of catheterization and type of drainage system.



RULE # 3

“discontinue Foley catheter as soon as possible”

always think of this rule on the third day

eg. when urinary volume monitoring is no longer necessary after the patient is out of shock state .

?suprapubic catheter

“Although preliminary data on the risk of infection are encouraging the benefit of the suprapubic catheter with regard to infection control has not been proven by controlled clinical studies.”

Ref.:Horgan AF et al. Br, J Urol 1992;70:149, Stickler DJ, Zimakoff J. J Hosp Infect 1994;28:177

?intermittent catheterization

well-designed clinical trials comparing the efficacy of intermittent catheterization to indwelling catheterization in minimizing the risk of infection are lacking.

Ref.: Stickler DJ, Zimakoff J. J Hosp Infect 1994; 28:177

Indwelling catheters should be properly secured after insertion to prevent movement and urethral traction.

Urine Bag

Collecting bags should always be kept below the level of the bladder.

CDC category I suggestion.

Draining the urine from the bag

the collecting bag should be emptied regularly using a separate collecting container for each patient (*the draining spigot and nonsterile collecting container should never come in contact)*

Ref.:. Marrie TJ et al. Can Med J 1978;119:593

There is no “routine” intake-output measurement order.

?Meatal care

Prospective, controlled study have shown that meatal care practice (either twice-a-day cleansing with povidone-iodine solution followed by povidone-iodine ointment or daily cleansing with soap and water) was ineffective in reducing the frequency of catheter-associated infections in patients on closed urinary drainage

Ref: Burke JP et al. Am J Med 1981;70:655

? Bladder irrigation

In one controlled study, continuous irrigation of the bladder with nonabsorbable antibiotics was associated with frequent interruption of the closed drainage system and did not bring about a reduction in the frequency of catheter-associated infections.

Ref.:Warren JW . N Engl J Med 1978;299:570

? prophylactic antibiotics

Several studies have shown that prophylactic systemic antibiotics delay the emergence of catheter-related infection, but this protective effect was transient and was associated with the selection of antibiotic-resistant microorganisms.

Ref.: Britt MR et al. AAC 1977;11:240

When to change the catheter?

(1)If the catheter becomes obstructed **and can be kept open only by frequent irrigation, the catheter should be changed.**

(2) ***if it is likely that the catheter itself is contributing to the obstruction (e.g., formation of concretions).***

Catheter Replacement?

In a study, 82% of catheters were replaced before one month because of obstruction, persistent leakage around the catheter or removal of the catheter by the patient.

Ref.: Cools HJM, Van der Meer. Br J Urol 1986; 58:683

Urine culture before removal of catheter?

“ Only one of 72 patients was given antibiotic as a consequence of the initial culture, and 18 patients (25%) whose initial cultures showed significant bacteriuria, had non significant growth on subsequent MSUs cultures.”

Ref.: Davies AJ& Shroff KJ. J Hosp Infect 1983; 4: 177

Catheter tip culture?

“ There was a 98% probability that at least one organism from the catheter tip culture would not grow in a simultaneous urine culture. Presence of most organisms in the tip probably represented contamination from the urethra.”

Ref.: Gross P et al. JAMA 1974; 228:72

“The best means of prevention is the avoidance of catheter when unnecessary and prompt removal when the need no longer exists.”
Calvin M. Kunin MD.